What is claimed is:

[Claim 1]   1. A method for redundant array of independent disks (RAID) consistency initialization comprises:

creating RAID, including setting a RAID configuration of the RAID and creating an initialization progress table for storing progress states of the initialization of the RAID, wherein after the initialization progress table is created and before the completion of the consistency initialization is completed, the RAID is allowed to access and the consistency initialization is allowed to start.

[Claim 2]   2. The method of claim 1 wherein the RAID configuration is stored in a non-volatile memory device.

[Claim 3]   3. The method of claim 1 wherein the consistency initialization comprises an induced consistency initialization.

[Claim 4]   4. The method of claim 3 wherein the induced consistency initialization comprises:

(a) detecting whether the consistency initialization is completely performed on the whole RAID when the RAID receives an I/O;
(b) if step (a) is negative, detecting whether a regional initialization is completely performed on an initialization region associated with the I/O;
(c) if step (b) is negative, detecting whether the regional initialization is being performed on said initialization region associated with the I/O;
(d) if step (c) is affirmative, waiting for the completion of the regional initialization, and if step (c) is negative, performing the regional initialization on said initialization region and updating initialization a state change of the initialization region to said initialization progress table; and

(e) writing the updated initialization progress table into the non-volatile memory device if a predetermined condition is met.

[Claim 5] 5. The method of claim 4, wherein the I/O accesses the RAID after step (e).

[Claim 6] 6. The method of claim 4 wherein the I/O accesses the RAID before step (e).

[Claim 7] 7. The method of claim 1 , wherein the consistency initialization further comprises a consecutive consistency initialization.

[Claim 8] 8. The method of claim 7, wherein the consecutive consistency initialization comprises following steps:

(a) selecting an initialization region which has not been completed with initialization yet;
(b) if a regional initialization is not being performed on the selected initialization region, performing the regional initialization on the initialization region;
(c) if step (b) is performed, updating the initialization state changes of the initialization region to an initialization progress table;
(d) if a second predetermined condition is met, writing the updated initialization progress table into the memory device; and
(e) repeating step (a) through step (d) until all initialization regions are completed with initialization.

[Claim 9] 9. The method of claim 8 further comprising:

(f) writing a state showing that all initialization regions are completed with initialization into a non-volatile memory device after step (e).

[Claim 10]   10. The method of claim 7 further comprising: (a0) performing a regional initialization priority adjustment mechanism to determine whether selecting an initialization region which has not yet been completed with initialization or not before the step (a) selecting the initialization region which has not been completed with initialization yet and said step (e) comprising repeating steps (a0) through (d) until all initialization regions have been completed with initialization.

[Claim 11]   11. The method of claim 1 wherein the consistency initialization further comprises a consecutive consistency initialization and after the initialization progress table is created, the consecutive consistency initialization is allowed to start anytime.

[Claim 12]   12. The method of claim 1, wherein the RAID is allowed I/O accessing before the consecutive consistency initialization.

[Claim 13]   13. The method of claim 1, wherein the consistency initialization comprises dividing a data space of member disks into a plurality of initialization regions and performing the regional initialization on the initialization regions.

[Claim 14]   14. The method of claim 3, wherein the consistency initialization comprises dividing a data space of member disks into a plurality of initialization regions and performing the regional initialization on the initialization regions.

[Claim 15]   15. The method of claim 3, wherein the consistency initialization comprises dividing a data space of member disks into a plurality of initialization regions and performing the regional initialization on the initialization regions, and the initialization progress table updated due to an

I/O accessing a data space of the RAID and inducing the regional initialization is written into the non-volatile memory device after said accessing has been completed, and then an I/O result is returned.

[Claim 16] 16. The method of claim 3, wherein the consistency initialization comprises dividing a data space of member disks into a plurality of initialization regions and performing the regional initialization on the initialization regions, and the initialization progress table updated due to an I/O inducing the regional initialization is written into the non-volatile memory device first, and then said I/O accesses a data space of the RAID.

[Claim 17] 17. The method of claim 2, wherein the non-volatile memory device is a member disk.

[Claim 18] 18. The method of claim 2, wherein there are a plurality of versions of the initialization progress table stored in the memory device.

[Claim 19] 19. The method of claim 1, wherein if a member disk failed and a new member disk is used to perform a rebuilding of the RAID before the completion of the consistency initialization, the rebuilding only has to perform on the regions which have been completed with the consistency initialization and the rebuilding on the regions which have not been completed with the consistency initialization can be performed by the consistency initialization.

[Claim 20] 20. The method of claim 1, wherein when an I/O operation accessing the RAID is a read operation and a region on the RAID to be accessed by the I/O has not been initialized yet, no consistency initialization is performed on the region, and a value of zero or a predetermined value will be returned directly.

[Claim 21] 21. The method of claim 1, wherein when a RAID performs an I/O operation and causes an induced consistency initialization, if the induced consistency initialization has been completed but the I/O operation has not been completed while the updated initialization progress table has been written into member disks of the RAID, the updated initialization will not be written into the member disks again due to completion of the I/O operation.

[Claim 22] 22. The method of claim 2, wherein the memory device is a battery backed-up SRAM, a flash RAM or a disk drive except a member disk.